5. Environmental Consequences

5. Environmental Consequences

Introduction and Methodology

In the context of an EA, NEPA requires that federal agencies evaluate the proposed federal action to determine whether it would result in significant effects on the human environment. This chapter analyzes the environmental impacts of the four Trails Plan alternatives on geology, hydrology, biological resources, cultural resources, traffic safety, visitor use, visual resources, air quality and noise. This analysis provides the basis for comparing the beneficial and adverse effects of the alternatives, and includes an assessment of cumulative effects and impairment to park resources or values.[1] The effects on floodplains and environmental justice are also briefly addressed. Chapter 7, Appendices, includes the Finding of No Significant Impact, which concludes the NEPA evaluation of the Trails Plan.

Both NPS and the Trust will use the EA to assist in their respecive planning and decision-making. The Trails Plan/EA is a programmatic plan and EA. Proposed trail routes and designs have not been finalized in every instance, and some connections or routes may be subject to further planning and environmental review prior to implementation consistent with the provisions of NEPA.

NEPA requires consideration of context, intensity, duration and type of impacts associated with project alternatives:

- Context. The context of the impact considers whether the impact would be local or regional. For the purposes of this analysis, local impacts would be those that occur within the immediate vicinity of the Presidio. Regional impacts would be those that would occur in the San Francisco Bay Area.
- Intensity. The intensity of the impact considers whether the effect would be negligible, minor, moderate or major. Negligible impacts would not be detectable and would have no discernible effect. Minor impacts would be slightly detectable, but would not be expected to have an overall effect on the character of the resource. Moderate impacts would be clearly detectable and could have an appreciable effect. Major impacts would have a substantial, highly noticeable influence.
- Duration. The duration of the impact considers whether the impact would occur in the short term or the long term. A short-term impact would be temporary in duration and would be associated with transitional types of impacts or construction-related impacts. Long-term impacts are those effects that would last one year or longer.

[1] To assure fulfillment of NPS' mission, NPS Management Policies (NPS 2001b) and NPS Director's Order-12, Conservation Planning, Environmental Impact Analysis, and Decision-making (NPS 2000a), require NPS decision-makers to consider impacts, and determine in writing, that a proposed action will not lead to "impairment" of park resources and values before approving the action. The statutory concept of "non-impairment" derives from NPS' enabling legislation, the 1916 Organic Act. Analysis of impairment is not a requirement of the Trust and only applies to lands managed by the NPS (Area A of the Presidio). An analysis and determination concerning impairment of park resources in Area A of the Presidio is made at the end of each resource topic to satisfy the NPS requirement.

- Type of Impact. Impacts were evaluated in terms of whether they would be beneficial or adverse. Beneficial impacts would improve resource conditions. Adverse impacts would deplete or negatively alter resources.

Geologic Resources

Affected Environment

Various soil types have developed over time in the Presidio. Modern urban development has altered distinguishing characteristics of some soil types while others, not disturbed by changes to the topography, remain in their natural state. Wind, water and human disturbance can and have eroded these soils. The extent of erosion depends on the slope, the ability of the soil to infiltrate surface water and the degree of compaction.

The Presidio contains bedrock of the Franciscan Assemblage, a formation consisting of altered volcanic rocks, basalt, chert and sandstone, which originated as ancient sea floor sediments. These can best be seen as outcrops along the irregular, eroded coastal bluffs. Serpentinite, with its green color and soft, slippery appearance, along with associated soils and habitat, is a sensitive natural feature of the Presidio.[2] Serpentine soils can be found along the northern and western coastal bluffs between Battery Crosby and the Golden Gate Bridge. In other areas of the Presidio, wind-blown sand has formed over thousands of years.

Environmental Consequences

Alternative A: No Action Alternative (Local, Long-Term, Minor, Adverse Impact)

Under the No Action Alternative, the Presidio's geologic resources, particularly the highly weathered, fine-grained soils, the steep, eroded bluffs (e.g., California Coastal Trail), and the low wooded hills (e.g., Ecology and Bay Area Ridge Trails) would continue to be adversely affected by soil compaction and degradation caused by foot traffic on existing trail alignments (particularly on social trails with poorly or infrequently maintained soil). Trails not improved under the current management procedures would continue to be subjected to compaction and degradation, which would increase soil loss through wind and water erosion, and impede natural material deposition and soil development. This wearing-away process would expose an ever-increasing area to accelerated rates of erosion and contribute to formation of scour areas, such as those located along the sand dune bluffs near Baker Beach (e.g., the California Coastal Trail).

Alternative B: Mixed Use Alternative (Local, Long-Term, Minor, Beneficial Impact)

Implementing of the Mixed Use Alternative would recondition many existing designated trails, and remove or recondition non-designated trails that have or could cause adverse impacts to geologic resources. These resources include sensitive areas with developed soil units or geologically sensitive

[2] Serpentine soils in the Presidio, which host two of California's rarest plant communities (serpentine grasslands and serpentine coastal bluffs), as well as other soil types found in the Presidio, create habitat for seventeen special status plants.

areas. This alternative would install new trails that are designed to avoid adverse impacts to such resources. Removal and rehabilitation of social trails would reduce disruption to natural geologic processes in the Presidio, removing foot traffic in areas near sensitive geologic resources and reducing access to sensitive areas that are vulnerable to heavy visitor use (such as soils susceptible to erosion in the Inspiration Point-El Polin Springs area). Placement and construction of new trails would avoid unnecessary removal or loss of soil or natural earth material. Trails would be constructed to applicable design specifications as defined by NPS and the Trust. Best Management Practices as described in Appendix C include a number of basic design strategies to improve drainage control, stabilize trail cuts on steep slopes, protect eroding and hazardous trail edges and maintain stable trail surfaces on sandy soils. Earthquakes and their associated ground failures are unavoidable and unpredictable and the alternative would not subject Presidio visitors to an increased risk of personal injury resulting from seismic hazards.

Alternative C: Shared Use Alternative (Local, Long-Term, Minor, Beneficial Impact)

Impacts to geologic resources resulting from implementing the Shared Use Alternative would be similar to the Mixed Use Alternative.

Alternative D: Dispersed Use Alternative (Local, Long-Term, Minor, Beneficial Impact)

Impacts to geologic resources resulting from implementing the Dispersed Use Alternative would be similar to the Mixed Use Alternative.

Impairment

Implementing the alternatives would not result in impairment of park resources or values related to geologic resources.

Hydrologic Resources

Affected Environment

Three primary watershed basins in the Presidio, Western watershed, Lobos Creek watershed and El Polin watershed, drain directly to the bay or ocean. About 16 h (40 ac) of the 596 h (1,491 ac) park (surrounding the Public Health Service Hospital) drain into the City of San Francisco's combined storm water/sewer system.

The four major fresh water resources in the Presidio are Lobos Creek – which supplies drinking water to the Presidio – Mountain Lake, El Polin Spring and an unnamed spring located between Rodriquez and Sanchez Streets. Other features include wetlands, seasonal drainages and seeps. Although most of these water features have undergone alteration from their natural state sometime in the past, they existed at the Presidio prior to European settlement and development.

Crissy Marsh, a recently restored tidal marsh, is a 7.3 h (18 ac) water feature that receives stormwater flows and limited perennial flows from the Tennessee Hollow watershed.

Groundwater at the Presidio occurs within Franciscan bedrock and overlying unconsolidated sediments. The quantity of groundwater is highly dependent on the type and thickness of the geologic materials present.

Water quality at the Presidio has been affected by past activities, such as creating landfills, installing of underground petroleum and oil storage tanks, and using herbicides, fungicides and insecticides while the U.S. Army managed the Presidio. Nonpoint-source runoff from roads and parking lots can affect water quality by introducing organic chemicals and heavy metals.

The Presidio's Stormwater Management Plan (Dames &Moore 1994), which is currently being updated, contains a stormwater pollution prevention plan that outlines erosion and sedimentation prevention control measures to avoid contamination of storm drains and surface water resources. In many areas, stormwater runoff is treated with oil and water separators prior to discharge. The quality of surface water samples at Lobos Creek, Mountain Lake and El Polin Springs is generally good.

Environmental Consequences

Alternative A: No Action (Local, Long-Term, Minor, Adverse Impact)

The trails network in the Presidio would continue to affect surface water hydrology under the No Action Alternative. Existing poorly maintained trails and social trails would continue to redirect surface water flows, initiate soil erosion, and affect water quality due to sediment transport. Hydrologic features would continue to be affected by sedimentation and water quality impacts associated with trail alignments, particularly where a poorly designed trail or social trail traverses an area close to such features as a water body, natural groundwater seep or spring.

Alternative B: Mixed Use (Local, Long-Term, Minor, Beneficial Impact)

Surface Water. Improvements to the pedestrian trails and removal of social trails under the Mixed Use Alternative would minimize concentrated runoff, reduce sediment transport, and improve the quality of collected surface water. New and restored trails, such as the multi-use and pedestrian trails proposed along the Coastal Bluffs and in the Mountain Lake area, would be constructed to reduce formation of erosional features. For example, new trails would have permeable surfaces to distribute runoff through the bed material of the trail or would be out-sloped to prevent gullying. Trail slopes and gradients would comply with standard guidelines so that concentrated quantities of surface water would not run off at velocities capable of removing trail base material. Appropriate design would drain surface water from the trail to avoid ponding and development of soft, muddy surfaces that can lead to soil degradation and water quality impacts. The design of trail features that intersect natural surface water bodies, such as bridges or wooden boardwalks (e.g., Lobos Creek Trail), would include measures to avoid or reduce interference with the feature's natural flow dynamics.

Replacement of certain existing social trails with planned pedestrian routes (e.g., Battery Crosby area, Rob Hill area, Inspiration Point) would discourage formation of new social trails, thus contributing to restoring natural surface water flow regimes and allowing natural runoff processes to prevail. Improvements to existing trails and placing new multi-use trails in areas adjacent to hydrologic features would reduce the likelihood of sedimentation and water quality impacts associated with visitor use of poorly designed or degrading trail alignments. Trail regrading and improvements would allow visitors to access the Mountain Lake and Lobos Creek Valley areas without causing adverse impacts to shoreline soils and water quality, and avoiding the damaging effects of current use of social trails, including surface water erosion, sedimentation, and the introduction of human and animal wastes into surface waters.

New and rehabilitated trails would be constructed to avoid other hydrologic features, especially the sensitive areas surrounding groundwater seeps and springs. Best management practices would be used during trail construction activities to minimize erosion, surface runoff, and siltation of any creek, spring, or water body. Trails would be constructed to applicable trail design specifications. Appropriately engineered base material such as gravel, or crushed rock would underlie proposed paved trails. Non-paved trail surfaces would be compacted, surfaces composed of sand, gravel or crushed rock or other materials described in Chapter 3. Trails would be designed with adequate drainage to divert sheet and gully flow that could result from rainstorms. The drainage systems would be designed to maintain the natural function of the hydrologic system. Diverted runoff would be dissipated to avoid rills, gullies, loss of soil, and water quality degradation.

The proposed increase in the amount of trails throughout the Presidio for the Mixed Use Alternative would increase the amount of hardened surface by 3.8 h (9.6 ac) on what is now open, unpaved land (see Table 5.1). This would increase the amount of surface water requiring preventive erosional measures (as outlined in Appendix C and the Stormwater Management Plan) as well as increase the potential for minor impacts in the form of increased concentration of runoff and sediment.

Groundwater Recharge. Incremental increases in hardened surfaces proposed by the Mixed Use Alternative would result in an incremental increase in stormwater runoff, although trail runoff would be directed to drainages designed to minimize erosion and sedimentation, as described above, and in some areas would permeate through adjacent swales or natural areas. Hardened trails may be porous, such as a boardwalk or porous asphalt, or they may be non-porous such as normal asphalt, concrete, "Road-Oyl"®, decomposed granite, or compacted soil. Where feasible, auto lane widths, which vary throughout the Presidio, would be reduced to allow trails, or portions of trails to be constructed on what are now existing paved surfaces. An example of this would be along Park Boulevard between Lincoln Boulevard and Washington Boulevard, where much of the road is wide enough to accommodate a trail. Many bike lanes can be accommodated in the current street width such as on Lincoln Avenue between Crissy Field Avenue and the Toll Plaza.

Table 5-1. Changes to Trail Surfaces

	ALTERNATIVE			
	No Action km (mi)	**Mixed Use km (mi)**	**Shared Use km (mi)**	**Dispersed Use km (mi)**
New Hardened Trail Surface				
New Pedestrian Trail	0	4.3 (2.7)	1.6 (1)	8.2 (5.1)
New Multi-Use Trail	0	10.4 (6.5)	11.9 (7.4)	2.4 (1.5)
Subtotal	**0**	**14.7 (9.2)**	**13.7 (8.5)**	**10.6 (6.6)**
Hardened Surfaces to Remain				
New Trails on Existing Hardened Surface	0	42.2 (26.4)	40 (24.8)	41.7 (25.9)
Existing Designated Trails to Remain (Hardened Surface)	30 (18.6)	26.9 (16.8)	30 (18.6)	30 (18.6)
Subtotal	**30 (18.6)**	**69.1 (43.2)**	**70 (43.4)**	**71.7 (44.5)**
Hardened Trails Restored to Vegetation				
Existing Hardened Trail Surface to be Revegetated	0	0.0	0.0	0.0
Social Trails to be Restored to Vegetation	0	-7 (-4.4)	-8.7 (-5.4)	-7 (-4.8)
Subtotal	**0**	**-7 (-4.4)**	-8.7 (-5.4)	**-7 (-4.8)**
Changes to Social Trails (Considered Hardened)				
Social Trail to Pedestrian Trail	0	5.8 (3.6)	2.9 (1.8)	1.9
Social Trail to Multi-Use Trail	0	3 (1.9)	4.4 (2.7)	0.5
Social Trails to Remain	9.9	0.0	0.0	0.0
Subtotal (Hardened Trail Surface to Remain)	**0**	**8.8 (5.5)**	**7.3 (4.5)**	**8.2 (5.1)**
Total Increase in Hardened Surfaces	0	23.5 (14.7)	12.3 (7.6)	11.1 (6.9)
Total Designated Trails	**30 (18.6)**	**85.6 (53.5)**	**82.3 (51)**	**82.9 (51.4)**
Note: All action alternatives will close some social trails and/or convert them to pedestrian or multi-use trails.				

Alternative C: Shared Use (Local, Long-Term, Minor, Beneficial Impact)

The implementation of the Shared Use Alternative would result in more hardened surface, 5.5 h (13.7 ac), compared with the Mixed Use Alternative, 3.8 h (9.6 ac). Preventive erosional measures as outlined in Appendix C and the Stormwater Management Plan would minimize any adverse impact resulting from stormwater runoff. The beneficial effects of trail rehabilitation and reduction of existing social trails under this alternative would outweigh the minor adverse impact to hydrologic resources due to the slight increase in hardened surfaces.

Alternative D: Dispersed Use (Local, Long-Term, Minor, Beneficial Impact)

The Dispersed Use Alternative would result in less hardened surface, 3.4 h (8.5 ac), compared to the Mixed Use Alternative, 3.8 h (9.6 ac). Implementing preventive erosional measures as outlined in Appendix C and the Stormwater Management Plan would minimize any adverse impact resulting from stormwater runoff. The beneficial effects of trail rehabilitation and reduction of existing social trails under this alternative would outweigh the minor adverse impact due to the slight increase in hardened surfaces.

Impairment

Implementation of the alternatives would not result in impairment of park resources or values related to hydrologic resources.

Biological Resources

Affected Environment

Sand dunes, grassland, coastal scrub, freshwater creeks and saltwater marshes were once dominant features in the City of San Francisco, until urban expansion and widespread planting of non-native trees eliminated nearly every indication of dune topography and native vegetation (Wagstaff 1938; Cooper 1967). Today, only fragments of dune topography, native vegetation, rare plants and wetlands remain in the City, and these features mainly occur in the Presidio.

Due to urban expansion, many animals, once plentiful on the San Francisco Peninsula, are now absent and smaller species such as reptiles, amphibians and invertebrates are often restricted to small areas of remnant habitat. While the habitats and populations they support are not large, the Presidio still has a unique and important role to play in supporting wildlife in the Bay Area.

Vegetation and Wildlife. Plant communities located in the project areas[3] include central coast arroyo willow riparian scrub, northern coastal bluff scrub, northern coastal scrub, northern foredune, central dune scrub, central coast live oak riparian forest and serpentine prairie (refer to the Natural Areas described and mapped in the VMP for a description of these plant communities and their associated wildlife). Of the identified plant communities, coast live oak woodland, central coast arroyo willow riparian, mixed serpentine chaparral, northern coastal bluff scrub, serpentine bunchgrass grassland and northern foredune are considered sensitive plant communities because they support a high diversity of native plants and special status plant species, or have limited distribution in the Presidio.

Wildlife Movement Corridors. Wildlife movement corridors link areas of suitable wildlife habitat that are otherwise fragmented by rugged terrain, changes in vegetation, human disturbance, or urban development. Movement corridors are important because urbanization has fragmented or separated open space areas that otherwise would provide for large, sustainable wildlife populations. At the Presidio, movement corridors occur along the coasts of the San Francisco Bay and the Pacific Ocean; in an east-west corridor through the golf course and cemetery; and in a north-south corridor through the developed areas along the eastern Presidio boundary. Developed habitats may function as corridors, and thus are included because some resident species (as opposed to migrant species) appear to use these areas more readily than more naturally vegetated habitats (Poague et al., 2000).

Special Status Species. A total of 17 special status plant species are known to occur in the Presidio, five of which are federally listed as endangered or threatened, occuring on serpentine and/or sandy soils. Of these federally listed plant species, existing populations of Presidio clarkia (*Clarkia*

[3] Defined as 20-ft wide corridors centered on proposed constructed or enhanced trail alignments.

franciscana), San Francisco Lessingia (*Lessingia germanorum*), Raven's manzanita (*Arctostaphylos hookeri ravenii*), and Marin dwarf flax (*Hesperolinon congestum*) occur within 30 m (100 ft) of proposed, constructed or enhanced trail footprints. Proposed future habitat is described in the Draft Recovery Plan for Coastal Plants of the San Francisco Peninsula (Coastal Plan) (USFWS 2001) and the Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area (Serpentine Plan) (USFWS 1998).

Four species of nesting passerines (songbirds), several species of nesting raptors, and populations of California quail may occur in or adjacent to the project area during the nesting season (February 15 through August 15). This includes several locally uncommon birds that have been identified on the Presidio, and others for which suitable habitat has been identified. A brief list of these species includes Western screech owl (*Otus kennicottii*), Hutton's vireo (*Vireo huttoni*), California quail (*Callipepla californica*), Saltmarsh yellowthroat (*Geothlypis trichas*), Red-shouldered hawk (*Buteo lineatus*), Red-tailed hawk (*Buteo jamaicensis*) and American kestrel (*Falco sparverius*).

Wetlands. There are approximately 23.4 h (58.5 ac) of water features, including wetlands, and other special aquatic areas in the Presidio. These areas include those subject to jurisdiction of the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act of the United States (CWA), and USFWS wetlands according to the Cowardin classification (Cowardin et. al., 1979). Specific wetland classes identified in the project area are riverine (rivers, creeks, and streams) and palustrine (shallow ponds, marshes, swamps, and sloughs). These include:

- Palustrine unconsolidated bottom (including the open waters of Mountain Lake)
- Riverine upper perennial (main channel of Lobos Creek)
- Palustrine emergent habitat (emergent wetland (e.g., marsh, meadow) throughout the Presidio, including areas near Inspiration Point, Lovers Lane and along Lincoln Boulevard)
- Palustrine scrub shrub habitat (riparian scrub such as willow) habitat at Mountain Lake, El Polin Springs and Lobos Creek)

According to NPS data (Castellini 2001), wetlands likely subject to the jurisdiction of the Corps as waters of the U.S. include areas at Crissy Marsh, Dragonfly Creek, North Fort Scott, Mountain Lake, Lobos Creek and portions of Tennessee Hollow and its tributaries.

Environmental Consequences[4]

Alternative A: No Action (Local, Long-Term, Minor Adverse Impact)

Under the No Action Alternative, many of the existing special status plant species present at the Presidio would remain protected from trail users by fences or designated trails, such as boardwalks, that encourage trail users to remain on the trail. Although many special status plant species and their

[4] This section is based primarily on information provided in the July 23, 2002 USFWS Final Biological Opinion (USFWS 2002) for the project, which applies to federally endangered or threatened plant species. A copy of the Final Biological Opinion is on file in the NPS and Trust offices, and is incorporated here by reference.

habitat are currently protected, individual specimens of some populations would remain vulnerable to trampling because of current social trails and future social trails that might be developed. Trampling of special status plants could result in plant mortality and habitat loss, which could cause population decline, a decline in species fecundity rates and an increase in local extinction rates.

Existing wildlife habitats would remain in their current condition along maintained trail and bikeway alignments. Trampling due to the presence of existing and future social trails would continue to accelerate disturbance conditions, disrupting and fragmenting intact native plant and riparian communities and increasing native plant mortality. Trampling could result in native plant displacement by invasive non-native species, altered species composition of plant and animal communities, and habitat fragmentation. Social trails that remain open would adversely affect native wildlife habitat, associated wildlife species, and wildlife movement corridors due to human disturbances such as trampling, excessive noise and rapid movements, and harassment. Disruption of wildlife movement corridors due to habitat loss and/or fragmentation could eliminate travel paths for individual animals as they wander or disperse from their home ranges. The continuation and potential expansion of existing social trails would result in a local, long-term, adverse impact on native and riparian vegetation, including sensitive plant communities, and wildlife habitat.

All Action Alternatives (Local, Long-Term, Minor Beneficial Impacts)

In addition to habitat restoration, the action alternatives would benefit native plant communities, including federally listed plants and wildlife, by managing human access and redirecting access away from sensitive habitat areas. The effects of social trails would be reduced within areas supporting federally listed species or within recovery areas. Prioritization of trail removal activities would be coordinated with both natural resource specialists and trail planners. Within natural areas, trails would typically be located on existing disturbed areas. Disturbed areas include currently sanctioned trails, social trails, old roadbeds, and sidewalks. Trails may be realigned to reduce erosion or to bypass sensitive areas. The conversion of informal trails to designated trails would be reviewed by a multi-disciplinary natural resources team to ensure that the existing alignment had no negative effects on federally listed plant habitat. Boardwalks may also be incorporated into trail alignments in habitat for special status species to prevent off-trail use. Trail alignments may be moved as a management practice to allow recovery of sensitive species or reduce erosion. Final trail alignment and construction specifications would be consistent with the appropriate recovery plan objectives when trails fall within recovery unit areas.

Within the lessingia recovery areas (to be determined as part of the forthcoming final Coastal Plan), trails would be designed to the extent practicable to limit habitat effects, improve habitat values, promote flexibility for species population movement, encourage sand movement within the trail corridor and promote persistence of the dune annual community.

Within the potential recovery areas for Raven's manzanita, dwarf flax, and clarkia, trails would be designed to avoid or protect serpentine outcrops and soils that are important recovery habitat.

Trail construction would limit the loss or degradation of hydrological features, including protected wetlands, and/or natural hydraulic processes, and avoid negative effects to surface drainage and groundwater flow rates and direction. Buffers and erosion control measures would be incorporated into projects within habitats for listed species. Where practicable, new trails would be located at least 100 feet from the edge of listed plant habitats. In instances where buffer distance is limited, protective fencing or other protective measures (such as low shrub buffers and boardwalks) around affected habitat may be installed. Plant habitat areas adjacent to project sites would be monitored regularly. If these areas are found to be affected from increased visitor use, protective fencing or other measures would be either installed or modified.

A site-specific revegetation plan would be prepared for each trail project with revegetation needs within habitat(s) for federally listed plants. Treatments would be consistent with the VMP (or any amendments to it). Revegetation of social trail removals would be implemented in a timely manner, typically within six months of disturbance-related construction activities, depending upon habitat type, timing of trail work and availability of native plant propagules. If trail removal activities are discontinued due to lack of resources, an invasive non-native plant control program would be implemented until resources for removal and restoration become available again. To the maximum extent practicable, immediate revegetation would be implemented for federally listed species habitat and recovery areas that have been disturbed by construction or other project-related activities.

Listed plant species would be protected by managing visitor and pet access in special status species habitat and recovery areas. Interpretive materials emphasizing resource and conservation values would be provided where visitors may access habitat with federally listed species. Non-native wildlife control measures would be implemented when necessary and feasible. To protect species under the Migratory Bird Treaty Act, vegetation would be cut only outside of bird nesting season (currently January 15 to August 15) unless monitoring indicates nesting birds are not present.

Existing trails would be surfaced and/or widened and new trails would be constructed in the dunes near Baker Beach housing, Inspiration Point, Lobos Creek Valley, western coastal bluffs and the Tennessee Hollow Creek corridor. Trail construction would occur within or directly adjacent to proposed or existing habitat for the Raven's manzanita, lessingia, clarkia and dwarf flax. All trail planning would be coordinated with future restoration implementation efforts, and final alignments would be selected based upon avoiding optimum habitat for the listed species. Minimization and compensatory measures included in the Final Biological Opinion (USFWS 2002) and BMP's included in Appendix C would be incorporated into the project to minimize effects to biological resources.

Specific effects for each action alternative by trail segment are described as follows.

Alternative B: Mixed Use

Trail construction activities under the Mixed Use Alternative have the potential to have a short-term effect on a maximum of 1,444 sm (15,540 sf) of existing listed species habitat in natural areas.[5] The

[5]Effect estimates do not include existing disturbed areas such as road surfaces, trails and social trails.

potential permanent loss of existing listed species habitat in natural areas is 264 sm (2,838 sf). The potential permanent loss of proposed future habitat is 2,439 sm (26,256 sf). This also accounts for area that would be restored and protected as habitat for federally listed plants.

Multi-Use Trail Segment on Battery Caulfield Road. The Battery Caulfield Road restoration area supports one of the five populations of lessingia found on the Presidio. The construction of a trail segment within the eastern corridor restoration site could temporally eliminate approximately 342 sm (3,680 sf) of existing habitat, and could result in long term or permanent effects to approximately 205 sm (2,208 sf) of existing habitat and 123 sm (1,320 sf) of proposed future habitat for the lessingia. Concentrated visitor activities in the newly constructed trail corridor could also increase off-trail visitor and pet traffic, potentially causing trampling, inadvertent spread of invasive non-native species, and erosion. However, conservation measures such as protective fencing and removing non-designated trails would help ensure protection of the federally listed plant population.

Multi-Use and Pedestrian Trail Segments within the Wherry Housing Area and Graded Area 9. Incremental disturbance from non-designated trail use within sand dune habitat has had some beneficial effects to lessingia habitat because it has created openings for establishment of dune annuals. However, continued incremental and large-scale disturbances could result in inadvertent trampling of federally listed species, erosion, compaction of soils and reduced sand movement. The lessingia would benefit most from large-scale restoration in the Presidio's southwestern area; including the restoration of natural processes like wind disturbance, which creates exposed gaps within the dunes. Trail construction could hinder or allow surface movement of sand, encourage spread of invasive species throughout the trail corridors and subject lessingia to increased trampling and erosion from visitor use. Trail construction would avoid redirecting water flow to avoid causing erosion. The alternative's beneficial effects include removing non-designated trails within the proposed recovery unit and habitat restoration. Social trails not planned for enhancement within the southwestern corner dunes would be removed and restored (actual social trail locations would be identified and documented during trail planning and design within the southwestern corner of the Presidio). To minimize negative effects, trail construction design and implementation would be coordinated and conducted in a manner consistent with restoration goals, recovery objectives and the conservation measures identified in the Biological Assessment (Presidio Trust 2001a) for the Final Biological Opinion. Trail segments in this vicinity would permanently affect 3,979 sm (42,836 sf) of proposed future habitat for the lessingia.

Multi-Use Trail Segment on Quarry Road at Inspiration Point. Realigning Quarry Road could create an increased buffer of approximately 0.9 to 2.4 m (3 to 8 ft) between visitor access and the current eastern distribution of Presidio clarkia. Realignment activities would involve removing fill from the eastern section of the current trail (exposing native serpentine soils) and removing the drainage ditch east of the protective fencing, which currently undercuts and erodes the toe of the serpentine slope. Portions of an existing clarkia population currently located east of the protective fencing could be disturbed and/or removed during construction activities. Trail construction design specifications would ensure the protection of the current serpentine grassland topography and local hydrology. Negative effects could arise from an increase in encouraged visitor use as well as off-trail visitor and

pet use (although protective fencing and the steep elevation change between the trail and the clarkia population would help ensure protection of the population). Additional consultation during the design specification development, in accordance with Section 7 of the Endangered Species Act of 1973, as amended, may be warranted for this trail segment. The width of historic Quarry Road would remain about the same. Thus, trail realignment could result in temporal effects to approximately 232 sm (2,500 sf) of existing habitat. However, the alternative would result in a net gain of 46 sm (500 sf) of proposed future habitat for the clarkia.

Pedestrian Trail Segment (Batteries to Bluffs Trail) Traversing the Western Serpentine Bluffs. Construction activities required to establish this trail segment as a designated trail would permanently eliminate approximately 684 sm (7,360 sf) of proposed future serpentine habitat. Concentrated visitor activities in the new trail corridor could increase off-trail visitor and pet use, increasing trampling and erosion. Additionally, disturbance associated with trail construction and maintenance could increase the spread of non-native plant species, as well as continue to fragment habitat. However, providing a clear designated route on a boardwalk-type trail where none currently exists to concentrate visitor activities could also benefit special status species habitat. Interpretive signs would educate visitors of habitat concerns. The alternative's beneficial effects would also include the removal and subsequent restoration of social trails, focused visitor use on designated trails, correction of some drainage problems, and increased safety.

Non-designated Trail Segments Traversing the Western Serpentine Bluffs. Trail removal and restoration would expand and enhance serpentine habitat. Restoration activities such as soil decompaction and invasive species eradication would generally benefit Raven's manzanita, clarkia and dwarf flax through seed scarification, removing competition and providing additional habitat that under current conditions do not exist. Adverse effects resulting from social trail removal activities could include burial of existing seed banks and losing soil disturbing activities that may be necessary for seed scarification. Closing and removing social trails would result in a minimum permanent gain of 3,035 sm (32,670 sf) of proposed future serpentine bluff habitat for Raven's manzanita, clarkia and dwarf flax.

Pedestrian Trail Segment Providing Access to Lobos Creek from the Lobos Dunes Boardwalk. Trail construction could potentially result in the loss of lessingia specimens via removal, destruction or burial of individual plants and seed. Increased visitor activities in the newly constructed trail corridor could increase the potential for trampling and erosion. Additionally, disturbance associated with trail construction and maintenance would fragment habitat, increase the potential spread of invasive non-native species and could reduce movement of sand in the corridor. The construction of the boardwalk trail would temporarily eliminate approximately 252 sm (2,800 sf) of existing habitat and permanently eliminate 56.7 sm (630 sf) of existing habitat for the lessingia.

Pedestrian Trail Segment North of the PHSH (East-West Traverse). Trail construction could limit movement of sand, increase the potential for the transport of invasive non-native species, and attract off-trail visitor and pet use which could increase trampling and erosion. To minimize any effects, all trail construction design and implementation would be coordinated and consistent with the recovery

objectives for the lessingia as described in the forthcoming final Coastal Plan. Beneficial effects are the same as those discussed under the effects described for the multi-use trail segment on Battery Caulfield Road. Trail construction would temporarily affect 609 sm (6,560 sf) of existing habitat and would permanently eliminate 451 sm (4,854 sf) existing habitat.

Multi-Use Trail Segment North of Battery McKinnon-Stotsenberg. Construction activities required to establish this existing 2.4 to 3.6 m (8 to 12 ft) wide (and degraded) trail footprint along the Bay Area Ridge Trail near the Rob Hill Campground between Hunter Road and Compton Road as a multi-use trail would have no effect on existing habitat but would result in a permanent loss of 232.8 m (764 lf) of proposed future habitat for the lessingia. Beneficial effects would include managed visitor and pet access and correction of erosion problems.

Alternative C: Shared Use

Trail construction activities resulting from the Shared Use Alternative have the potential to have a short-term effect on a maximum of 1.3 h (3.2 ac) of existing listed species habitat in natural areas. The potential permanent loss of existing listed species habitat in natural areas is 0.9 h (2.3 ac). This alternative would also result in a permanent loss of 0.8 h (2 ac) of proposed future habitat. This also accounts for areas that would be restored and protected as habitat for federally listed plants. Specific effects for this alternative would be the same as the Mixed Use Alternative with the exceptions described below.

Multi-Use and Pedestrian Trail Segments within the Wherry Housing Area and Graded Area 9. This alternative would create a permanent loss of 4000 sm (47,916 sf) of future habitat in this segment.

Pedestrian Trail Segment North of the PHSH (East-West Traverse). This alternative would temporarily affect 2000 sm (23,958 sf) of existing habitat and would permanently eliminate 1080 sm (4,356 sf) of existing habitat for the lessingia.

Alternative D: Dispersed Use

Trail construction activities associated with the Dispersed Use Alternative have the potential to have a short-term effect on a maximum of 7000 sm (78,408 sf) of existing listed species habitat in natural areas. The potential permanent loss of existing listed species habitat in natural areas is 5000 sm (56,628 sf). This alternative would also result in a permanent loss of 7000 sm (78,408 sf) of proposed future habitat. This also accounts for area that would be restored and protected as habitat for federally listed plants. Specific effects for this alternative would be the same as the Mixed Use Alternative with the exceptions described below.

Multi-Use and Pedestrian Trail Segments within the Wherry Housing Area and Graded Area 9. This alternative would result in the loss of 2000 sm (23,958 sf) of future habitat.

Pedestrian Trail Segment (Batteries and Bluffs Trail) Traversing the Western Serpentine Bluffs. This alternative would not result in the permanent loss of existing or future habitat along this trail segment.

Pedestrian Trail Segment North of the PHSH (East-West Traverse). This alternative would temporarily affect 360 sm (4,000 sf) of existing habitat and would permanently eliminate 486 sm (5,400 sf) of existing habitat for the lessingia.

Impairment

The integrity of natural resources are a key element of the Presidio. Implementation of the alternatives would not impair NPS resources or values related to biological resources. The action alternatives would improve the long-term health of resources that are "key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park" (NPS 2001b).

Cultural Resources

Affected Environment

The Presidio of San Francisco was designated a National Historic Landmark (NHL) in 1962. With a period of significance from 1776 to 1945, the Presidio is recognized for its use as a Spanish colonial, Mexican and U.S. Army military post. In 1993, the landmark designation was updated to further identify this valuable resource (1993 NHL Update). At that time, more than 650 buildings, sites, structures and objects were considered as contributing to the significance of the NHL as a district. The update includes both cultural landscape resources, including the historic forest and archaeological resources.

Examples of archaeological resources known to exist in the Presidio include late 18th century building foundations and subsurface remains of past uses. In addition to known prehistoric sites along Crissy Field, several areas have been identified as archaeologically sensitive because of the discovery of additional prehistoric sites. These are the Estuary Bluff, which overlooks the former marshlands along the Letterman Complex, the North Cantonment, the Main Post, the Cemetery and Cavalry Stables, additional areas of Crissy Field and the Presidio's natural fresh water sources, such as El Polin Spring, Mountain Lake, Tennessee Hollow and Lobos Creek.

Environmental Consequences

Alternative A: No Action (Negligible, Adverse Impact)

The No Action Alternative would have a long-term, negligible, adverse impact on historic or architectural resources, including the cultural landscape. While no new trails would be developed, the number of park visitors would increase and demand would grow to access other locations in the park. Consequently, the number and length of social trails would likely increase. Existing and additional social trails could affect the cultural landscape (including the historic forest and strategic

vistas) and archaeological resources by increasing erosion, degrading vegetation and increasing wear and tear on structures. The intensity of impacts would depend upon the nature and location of the social trail, as well as the quantity and data potential of the archeological sites.

Alternative B: Mixed Use (Negligible, Adverse Impact)

The Mixed Use Alternative would add 56 km (35.1 mi) of trails in the park. This increase would change the character of the cultural landscape at the Presidio somewhat in some areas (e.g., by adding a multi-use trail along a historic road corridor). However, the width, surfacing and general appearance of the historic road corridors on the Presidio have changed over time as the Presidio's development footprint expanded. In cases where a historic curb or retaining wall defines the edge, that feature would be preserved. Also, in cases where existing trail alignments are historic (e.g., Lovers Lane), these would be preserved. The overall impact on the cultural landscape would be detectable, but would not be expected to have an overall effect on the NHLD because some of the new trails (7.7 km or 4.8 mi) replace existing social trails or are presently pedestrian trails or service roads to be converted to a multi-use trail. In addition, the new trails would be designed and constructed to visually blend with the existing topography and vegetation patterns to the maximum extent feasible. Trail surface materials would be tinted to blend in with surrounding terrain, and historic materials such as red chert would be used if appropriate. Trails would also provide controlled access to historic batteries, buildings and landscapes throughout the Presidio.

Proposed construction activities would occur primarily in previously disturbed areas such as along existing road prisms and social trails. Disturbance to historic fabric, removal of individual trees or alteration of character-defining features of the historic forest would be minimized. Final design of the trails would be reviewed by qualified personnel having experience in cultural landscape preservation prior to construction to ensure that cultural landscapes are adequately protected. In addition, proposed construction activities would be coordinated with the reforestation and natural areas restoration efforts under the VMP and done in accordance with the Secretary of Interior's Guidelines for Treatment of Cultural Landscapes (NPS 1996b). All ground-disturbing construction activities would be subject to archaeological monitoring in accordance with the NPS/GGNRA Programmatic Agreement (PA) (NPS 1994b) or the Presidio Trust PA (Presidio Trust 2002c) Stipulation XIII and the Presidio Archaeological Monitoring Protocols (whichever is applicable at the time of monitoring). Removal of 15.9 km (9.9 mi) of social trails would lead to long-term benefits to surface and underground resources by confining the effects of paths and reducing erosion. However, some new trail segments would pass through archeologically sensitive areas and other areas may be found to have historic or prehistoric sites or artifacts. Additionally, other as yet unknown historic or prehistoric areas in the Presidio may be discovered. Should that occur, NPS or the Trust would follow 36 CFR, Part 800 of the National Historic Preservation Act procedures outlined in their respective PAs. NPS and the Trust would seek to avoid archaeological features through the following options, listed in order of preference:

1) *Relocation*: Relocate the trail segment to an adjacent area that does not cross the site.

2) *Fill*: Apply a separating geotextile layer and filling over the site with a thick layer of stabilized granular material.

3) *Pave*: Pave over the site in the trail area and use a fence or in other ways confine users to the trail.

4) *Bridge*: Only if relocation, fill or paving are not feasible, build a bridge over the site.

If avoidance is deemed infeasible, consultation with the State Historic Preservation Officer in accordance with 36 CFR Part 800 and the provisions of the applicable PA would be implemented. Mitigation would include controlled excavation prior to construction, using scientific recording methods and recovery of any significant cultural materials or information. Archaeological excavations would proceed in accordance with a research design and data recovery plan based on background data, sound planning, and accepted archaeological methods. The data recovery plan would provide for the reporting and dissemination of results, as well as interpretation of what has been learned in a manner that is accessible and understandable to the public. Appropriate arrangements for the permanent curation of archaeological materials and records would be carried out in accordance with federal regulation 36 CFR Part 79. All archaeological work to be carried out would be under the supervision of persons meeting the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-44739).

Alternative C: Shared Use (Negligible, Adverse Impact)

The Shared Use Alternative would add the smallest amount of new trails (51.9 km or 32.4 mi) compared to the other Action Alternatives. However, impacts on the cultural landscape at the Presidio would be the same as the Mixed Use Alternative. Construction activities would occur primarily in previously disturbed areas such as along existing road prisms and social trails. Disturbance to historic fabric would be minimized; historic curbs, retaining walls and historic trail alignments would be preserved; and historic materials would be used if appropriate. Alteration of character-defining features of the historic forest and removal of individual trees would be minimized. Archaeological monitoring would occur in accordance with applicable PAs and protocols. Procedures outlined in the PAs would be followed in the event historic or prehistoric sites or artifacts are discovered. Therefore, while the impact on individual resources would be detectable, the alternative is not expected to have an overall effect on the NHLD.

Alternative D: Dispersed Use (Negligible, Adverse Impact)

The Dispersed Use Alternative would add fewer new trails (52.5 km or 32.8 mi) than the Mixed Use Alternative (56.2 km or 35.1 mi). However, impacts on the cultural landscape at the Presidio would be the same as the Mixed Use Alternative. The impact on individual resources would be detectable but the alternative is not expected to have an overall effect on the NHLD.

Impairment

None of the alternatives would result in impairment of park resources or values related to cultural resources.

Traffic Safety

Affected Environment

Access to the Presidio. Roadways leading into the Presidio and providing access for motor vehicles, transit vehicles, bicycles, and pedestrians include Lincoln Boulevard, Merchant Street, 15th Avenue, Arguello Boulevard, Presidio Boulevard, Lombard Street, Gorgas Avenue, and Marina Boulevard. Within the Presidio, the public has unregulated motor vehicle access to the vast majority of local roadways. Some intersections are controlled by stop signs and posted speeds are slow.

Presidio Roadway/Trail System. Trails for bicyclists and pedestrians run along and across many roads in the Presidio, including Lincoln Boulevard, Ralston Avenue, Washington Boulevard, Battery Caulfield Road, Park Boulevard, Arguello Boulevard, Infantry Terrace, Marine Drive, Long Avenue, Mason Street and Presidio Boulevard. These roads typically have two travel lanes, with pavement widths ranging from about 6 m (20 ft) to over 11 m (36 ft). Sidewalks are provided along portions of some, but not all, of the roads and marked crosswalks are provided where some, but not all, of the trails cross the roads.

City Bike Routes in the Presidio include # 95 (on the California Coastal Trail), # 65 (on the Bay Area Ridge Trail), # 69 (on the De Anza Trail) and #'s 2, 4, 55, 61, 195, 202 and 295.

Presidio Parking Facilities. Parking is provided at primary vista points, near a number of trails and near housing units and office buildings throughout the Presidio. Parking spaces are located along roads in areas of the roadway margin either designated for parking or used for that purpose informally. Paved parking lots are also provided within the Presidio, mostly associated with existing developed areas (e.g., the Main Post). In general, the Presidio is oversupplied with parking compared to present and estimated future demand. Both the GMPA and the PTMP call for reducing the overall amount of parking over time.

Traffic Safety Conditions. These are roadway segments where pedestrians, bicyclists and motorists either share a narrow paved space (e.g., on Long Avenue and Marine Drive) or have minimal physical separation (e.g., portions of Lincoln Boulevard and Washington Boulevard). There intersections with no delineated crossing control (e.g., California Coastal Trail near Lincoln Boulevard and Kobbe Avenue and Washington Boulevard between Arguello Boulevard and Park Boulevard). Areas also exist where pedestrians and bicycles share trails with limited physical separation (e.g., along the Crissy Field Promenade). There also are locations where trails cross roadways with no delineation of the crossing or where the delineation of the crossing is insufficient (e.g., several locations on Lincoln Boulevard).

The current roadway network and pedestrian facilities were established by the U.S. Army and were built to military standards over a long period of time. In many cases, the park has remnants of facilities that were built before modern transportation standards were developed. Bicycle access was not historically considered in the development of Presidio roadways and trails between different areas of the Presidio were not widespread. With the Presidio's change from a military base to a national park site, a new set of traffic safety issues has developed, with current users expecting that facilities would be built to modern civilian standards.

Environmental Consequences

Alternative A: No Action (Local, Long-Term, Minor Adverse Impact)

Under the No Action Alternative, the existing (primarily discontinuous) network of substandard pedestrian trails, multi-use trails, bikeways and social trails would remain substantially unchanged. Standard maintenance activities would be undertaken and social trails would be eliminated over time, consistent with the VMP. This alternative would not reconfigure the current network of trails for pedestrians and bicyclists, which generally provides limited or no physical separation between these users and automobiles. The discontinuity of trails and bikeways would not increase opportunities for recreational or commuter bicycle use and therefore would not therefore encourage reduction in automobile use to, from and within the Presidio. Roadside social trails generally would continue to be unbuffered from vehicular or bicycle traffic. Existing discontinuities on trails that connect to transit stops would remain.

Alternative B: Mixed Use (Local, Long-Term, Moderate Beneficial Impact)

The Mixed Use Alternative would provide about twice as many designated off-street trails as currently exist. The alternative would moderately reduce the potential for conflicts between automobiles, pedestrians and bicyclists within the trail corridors by separating pedestrian and bicycle use from automobile use. Pedestrians and bicyclists would be accommodated within the various trail corridors by a series of pedestrian trails, multi-use trails and/or bikeways. Multi-use trails would be engineered to meet AASHTO standards, including buffer widths to separate trails from roadways. The widths of trails would be sized to provide room for safe pedestrian and bicycling activities, minimizing the potential for conflicts between these modes of transport. Trail intersections with roadways would be marked with appropriate pavement treatments and signage to alert motorists and trail users to the presence of the crossing. Roadway intersections (e.g., Lincoln/Bowley, Lincoln/Kobbe and Lincoln/Merchant) would be reconfigured to improve bicycle, pedestrian and automobile safety by improving sight distances, realigning awkward geometrics and reducing grades.

In addition, a network of bike lanes and routes would be provided on roadways for bicyclists riding at higher speeds, either in bike lanes (i.e., separate pavement width delineated by striping), unmarked wide shoulders or in shared lanes on low-volume roadways. The amount of existing marked, designated on-street bike lanes would increase from 3.7 km (2.3 mi) to 23 km (14.4 mi). These separate facilities would provide options for serious cyclists, further reduce the potential for

pedestrian/bicycle conflicts on new multi-use trails, and encourage the use of bicycles as an alternative to the private automobile.

This alternative includes possibily closing Crissy Field Avenue between Mason Street and Lincoln Boulevard (uphill section) to auto traffic to provide for bicycle and pedestrian use. Transit and emergency access would be maintained. In addition, this alternative includes possibily closing Washington Boulevard between Arguello Boulevard and Lincoln Boulevard to through-traffic on weekends.

Short-term impacts on drivers from road closures would include the inconvenience of detours and having to learn new routes. Drivers would be informed in advance of road closures through signage and NPS and Trust publications. Detour/alternate cross-park routes would be designated, improved to handle increased traffic, and clearly signed in advance of closures as necessary. Road closures would be coordinated with the U.S. Park Police and appropriate transit agencies, if needed.

Implementation of this alternative may also involve narrowing the auto traffic travel lanes of park roadways to provide for bicycle and pedestrian use. In general, narrowing vehicle travel lanes would be proposed to minimize or avoid impacts to natural or cultural resources arising from the addition of bikeways, pedestrian facilities and/or multi-use trails. Travel lane narrowing would be limited to the minimum required to avoid sensitive resources. On roadways where speeds are low, the grade is slight and volumes are minimal, narrowing travel lanes would be easily achieved, with no effect on motorists (for example, on Moraga Street or Funston Avenue in the Main Post area). In other areas, narrowing the travel lanes would result in a small reduction in travel speed for vehicles and associated vehicle capacity. This impact would be minor, and capacity implications would not significantly increase congestion.

On major roadways, reductions in lane width would be considered carefully in the design of suggested trail and bikeway improvements, and would be balanced with vehicular safety concerns. Roadway cross-sections in Chapter 4 and the explanations of design exceptions in Chapter 3 acknowledge this process of considering potential impacts and benefits, and adjusting proposed improvements as necessary to avoid deleterious effects. Parking space reduction or relocation may occur, such as along Washington Boulevard between Arguello and Park Boulevards. Impacts on parking would be coordinated with parking planning at the Presidio.

Implementation of this alternative would most likely require design exceptions (e.g., features such as narrow bike lanes and/or multi-use paths, steep grades, sight distances, and design speeds that do not meet minimum design standards) in order to provide improved access and safety for bicyclists and pedestrians, and to protect natural and cultural resources. Design exemptions would be granted after careful study by qualified traffic engineers to determine that implementation of the project would provide improved conditions for bicyclists, pedestrians and/or automobile traffic over current conditions in terms of access, capacity and/or safety.

Alternative C: Shared Use (Local, Long-Term, Moderate Beneficial Impact)

The Shared Use Alternative would provide about 3½ times as many designated trails as currently exist. Similar to the Mixed Use Alternative, this alternative would moderately reduce the potential for conflicts among automobiles, pedestrians and bicyclists within the trail corridors because it would separate pedestrian and bicycle facilities from auto use areas. This alternative has the greatest extent of multi-use trails (41.8 km or 26.1 mi proposed). The network of multi-use trails would conveniently link main activity and residential areas. This would increase opportunities for recreational and commuter bicycle use, and promote bicycles as a transportation alternative. The alternative would also improve traffic safety by encouraging a reduction in automobile use to, from and within the Presidio.

The same roadways considered for closure to auto traffic under the Mixed Use Alternative would be proposed for closure in this alternative. These closures would result in the same short-term impacts to drivers as they learn alternate routes on their destinations.

Narrowing roads for auto traffic to provide for bicycle and pedestrian use would result in the same short-term impacts on drivers as the Mixed Use Alternative, and would require the same careful consideration prior to implementation. Implementation of this alternative would most likely require design exceptions similar to the Mixed Use Alternative, to avoid safety issues on major roadways, as provided for in Chapters 3 and 4. Impacts to parking would be the same as the Mixed Use Alternative.

Alternative D: Dispersed Use (Local, Long-Term, Minor Beneficial Impact)

The Dispersed Use Alternative would provide about three times as many designated pedestrian trails as currently exist. The alternative would moderately reduce the potential for conflicts between automobiles and pedestrians by providing 13.1 km (8.2 mi) of new pedestrian trails. The alternative would reduce the potential for conflicts between automobiles and bicyclists within the trail corridors only slightly. Because it emphasizes pedestrian-only trails, bicyclists would need to use on-street bikeways to a greater extent than the other action alternatives. This alternative would not provide for marked bike lanes around or in the Main Post, and only uphill bike lanes would be provided on Long and Crissy Field Avenues. With the least amount of interconnected multi-use trails proposed (17.4 km or 10.9 mi), this alternative would provide fewer opportunities for recreational, family and slower-speed bicycle use. In addition, this alternative has about 20 more intersections than the other action alternatives, where pedestrian trails would cross vehicular roads indicated by marked crossings and vehicular speed limits. Safety improvements would be designed for these locations prior to trail implementation. Road closures and narrowing of roads to auto traffic would result in the same short-term impacts on drivers as the Mixed Use Alternative. Impacts on parking would be the same as the Mixed Use Alternative.

Impairment

A key element of the Presidio is opportunities for public enjoyment. Without traffic controls and a reduction of trail crossings, the No Action Alternative could result in minor impacts on public enjoyment, but would not lead to impairment of the Presidio's resources or values. None of the action alternatives would impair national park resources or values related to traffic safety.

Visitor Use

Affected Environment

The Presidio contains many of San Francisco's highly valued recreation sites and popular open space areas. The park offers a wide range of active pursuits, as well as opportunities for solitude, retreat and discovery. Recreational activities at the Presidio include walking, hiking, running, biking, sightseeing, photography, nature study, surfing, sailing, fishing, camping, sunbathing and picnicking. The Presidio has nearly 30 km (19 mi) of trails and bikeways utilized by neighborhood, city and regional users, tourists and commuters. There are 3.7 km (2.3 mi) of marked bike lanes, 16.5 km (10 mi) of multi-use trails, and 17.7 km (11 mi) of walking/hiking trails. A minimum of 15 km (9.3 mi) of pedestrian trails are unofficial social trails created by park users, but not part of the Presidio's official designated trail system. The Presidio trail system also features five trailheads and six overlooks. National, state and regional trails traversing the Presidio include the Juan Bautista de Anza National Historic Trail, the California Coastal Trail, the Bay Area Ridge Trail, the San Francisco Bay Trail and the American Discovery Trail.

Use of the trails and bikeways network is hindered in several areas by access limitations, including disjointed routes, unstable slopes, sandy soils, elevation changes, sensitive natural resources and inconsistent trail conditions.

Environmental Consequences

Alternative A: No Action (Local, Long-Term, Minor, Beneficial Impact)

Under the No Action Alternative, the Presidio would continue to provide a range of recreational opportunities to visitors — from quiet walks though restored native habitats or forest to bicycling along a bayside promenade past centuries of military history. However, the 30 km (19 mi) of trails and bikeways within the park would continue to be somewhat discontinuous and provide limited connections to major Presidio destinations (e.g., between the Lombard Gate and the Golden Gate Bridge). Desired connections (such as between the California Coastal Trail and north Baker Beach) would not be provided. Discontinuous trails and bikeways would continue to make it difficult for commuters traversing the Presidio on foot or by bicycle. The varying trail surfaces and types (e.g., dirt paths, sidewalks, gravel access roads) and the varying bikeways (e.g., wide road shoulders, low-volume shared roadways, striped bicycle lanes) that provide connections across the Presidio would remain. In addition, the hilly terrain and inconsistent trail surfaces, widths and grades would continue to limit universal access to many Presidio recreational experiences, particularly for people with

disabilities. The inconsistent provision of trailheads, trail signs and amenities at trailheads and overlooks would also continue to detract from the visitor experience.

Alternative B: Mixed Use (Local, Long-Term, Moderate Beneficial Impact)

Implementing the Mixed Use Alternative would substantially enhance the visitor experience by providing more varied experiences for visitors, improving continuity and connectivity of the trail and bikeway system, improving trail and bikeway conditions and providing new trails, bikeways, trailheads, overlooks and trail signs. Trail types and connections would provide a mix of "urban" (through the built environment) and "wild" (through a natural or forested environment) visitor experiences, and trails would be constructed with varying degrees of physical challenge. Recreational routes would be designed for safe and enjoyable use of park facilities by visitors of all ages and abilities, including accessible connections to major use areas, points of interest, interpretive opportunities and outstanding natural features. Public safety conditions would improve due to the planned closure of many hazardous social trails, the addition of safe street crossings, and weekend or permanent closures of some roads to vehicles. The construction of new, sustainable pedestrian and multi-use trails (in areas such as north Baker Beach and the coastal bluffs) would balance the removal of unsafe and unstable social trails. Visitors accustomed to using these social trails would be directed to other trails in the vicinity.

The alternative would have consistent types of trails (multi-use or pedestrian) based on design specifications consistent with Recommendations for Accessibility Guidelines: Outdoor Developed Areas (U.S. Architectural and Transportation Barriers Compliance Board 1999). The trails would have consistent surface types, widths and grades within individual trail corridors. New trails would typically be separated from vehicles and trail crossings would be marked, thus creating safer routes for park visitors. East-west and north-south trail connections across the Presidio would be created or improved through providing new trail corridors. Trail connections to major use areas, points of interest and natural features would be improved. In addition, the trail continuity of the regional, state and national trails in the Presidio would be improved.

The alternative would improve off-street bicycling opportunities for family and recreational cyclists. Many of the proposed multi-use trails would form continuous loops, which would further enhance the off-street bicycling experience. On-street bicycle routes would be provided for faster cyclists. Bikeways would be improved to include more linear miles of bike lanes, with reduced reliance on wide roadway shoulders for bicycle routes. Trail improvements would also benefit bicycle commuters who travel through the Presidio. These benefits include new trails and connections established between trails to provide commuters with more direct routes to or through the Presidio.

The alternative would substantially increase the number of trailheads, from 9 to 13. Trailheads would provide consistent information, orientation, and amenities for visitors. Similarly, new trail signs would be installed throughout the Presidio, providing consistent visitor orientation and accessibility information. Visitors would be less likely to lose their way or undertake a trail of too great or little challenge.

The number of overlooks at the Presidio would be increased from 6 to 14. New overlooks would be developed in such locations as the Golden Gate Bridge, Battery East and the San Francisco National Cemetery. New overlooks would provide more consistent amenities, and additional vistas from which to observe natural and cultural resources.

Construction activities would introduce construction equipment (and associated noise), work perimeter fencing and signs and closure of construction areas for public safety purposes. Construction activities would detract from the natural setting of the park and somewhat limit access within the Presidio. Development of the new trail alignments would occur gradually in phases, so that construction-related impacts would be localized to specific areas of the Presidio, diminishing any short-term effect on visitors.

Alternative C: Shared Use (Local, Long-Term, Moderate, Beneficial Impact)

Similar to the Mixed Use Alternative, implementation of the Shared Use Alternative would substantially enhance the visitor experience. However, this alternative would provide for an even more comprehensive and interconnected system of trails and bikeways. It would provide better pedestrian and recreational access to major points of interest, place more emphasis on wider, multi-use trails to accommodate large numbers of users, and provide a greater opportunity for group experience. As in the Mixed Use Alternative, trails and bikeways would generally be consistent and continuous. In providing more pedestrian and bicycle loop routes than the Mixed Use Alternative, it would provide fewer opportunities for dispersed visitor experiences, such as enjoying quiet solitude. The alternative would increase the number of trailheads from 9 to 13. The number of overlooks at the Presidio would increase from 6 to 18. As in the Mixed Use Alternative, construction activities would be phased, such that impacts would be localized to specific areas of the Presidio, diminishing any short-term effect on visitor experience.

Table 5-2. Trailheads and Overlooks

Alternative	Trailheads	Overlooks
No Action	9	6
Mixed-Use	13	14
Shared Use	13	18
Dispersed Use	25	18

Alternative D: Dispersed Use (Local, Long-Term, Minor, Beneficial Impact)

Similar to the Mixed Use Alternative, implementation of the Dispersed Use Alternative would substantially enhance the visitor experience. However, trail connections would not be as consistent and continuous. The alternative would provide more opportunities for pedestrians to experience solitude and greater physical challenges. Narrower pedestrian linkages and connections and fewer accessible trails and recreational bicycle trails would be provided. About half the number of multi-use trails, 17.6 km (10.9 mi), would be developed, as compared to the other action alternatives. No multi-

use loop trails would be made available for family and recreational bicyclists. Trailheads would be smaller and would increase from 9 to 25. Some new trailhead parking would be constructed to accommodate people with disabilities. The number of overlooks at the Presidio would increase from 6 to 18 (same as the Mixed Use Alternative). Construction activities would have the same short-term effect on visitor experience as the Mixed Use Alternative.

Impairment

Implementation of the alternatives would not impair National Park resources or values related to visitor use.

Visual Resources

Affected Environment

The Presidio is a primary scenic resource of the San Francisco Bay Area. Together with Golden Gate Park to the south, the forested, open-space landscape of the Presidio is a regional landmark, visually prominent within the built environment of urban San Francisco. The Presidio affords a wide variety of distinctive views, ranging from panoramic vistas to narrow views of regional landmarks in the San Francisco Bay Area. Regional landmarks that appear in views from the Presidio include the Pacific Ocean and coastline, the Golden Gate, the Marin Headlands, San Francisco Bay, Alcatraz, Angel Island and the San Francisco skyline. The Presidio trails and bikeways network affords both fixed and dynamic, sequenced views of scenic resources located outside of the Presidio, as well as of scenic resources located within the Presidio itself. In addition, the 6 scenic overlooks, located mostly in the northern and western areas of the park, offer panoramic views. They range from formal paved viewing platforms with vehicle parking to informal widened areas on the sides of trails, to roads with no vehicle parking.

As part of implementing the VMP, the NPS and the Trust are restoring historic viewsheds that include overlooks and other vantage points located throughout the Presidio. These viewsheds include Inspiration Point, Rob Hill, vistas along Lincoln Boulevard and the coastal defense batteries, and the Golden Gate Bridge viewing area. Generally, historic viewsheds are being restored by removing non-native large trees, and planting low-lying native plants so that clear views can be more easily maintained.

Environmental Consequences

Alternative A: No Action (Local, Long-Term, Minor, Beneficial Impact)

Under the No Action Alternative, the current trail and bikeway alignments at the Presidio would be maintained and the existing scenic overlooks would remain in their present condition. Limited closure of certain social trails could occur as part of ongoing maintenance operations. The trail and bikeway system at the Presidio would continue to provide views of regional landmarks and other important scenic resources. The proliferation of social trails would continue to have both beneficial

and adverse effects on visual resources. While these social trails provide access to scenic vistas, as landscape features the social trails appear as a haphazard network of compacted dirt pathways that detract from the otherwise scenic surroundings.

Alternative B: Mixed Use (Local, Long-Term, Moderate, Beneficial Impact)

The implementation of the Mixed Use Alternative would provide improved visual access to regional landmarks and other important scenic resources of the San Francisco Bay Area. New pedestrian trails in the vicinity of Golden Gate Bridge Plaza would provide improved scenic viewing opportunities of the Golden Gate. New multi-use trails in the vicinity of Baker Beach would provide opportunities for scenic views of the Pacific Ocean and the shoreline for both pedestrians and bicyclists.

This alternative would provide improved access to visual resources within the Presidio, including natural features, native habitats, and cultural and historic resources. For example, the proposed Tennessee Hollow Corridor would provide opportunities to view natural and cultural resources located between El Polin Spring and the restored marsh at Crissy Field. The alternative would improve connections between Presidio points of interest, providing new dynamic view sequences, as well as static views, for people traveling along these routes. For example, the Presidio Promenade, which would provide a continuous multi-use trail between the Golden Gate Bridge and the new Greenwich Street Gate, would include views of Battery East, Cavalry Stables, the San Francisco National Cemetery, and the Main Post.

New overlooks would establish additional vantage points from which to observe the abundant scenic resources within the Presidio's various viewsheds, both those outside and within the park. Providing Presidio visitors with new viewpoints that would accommodate both social and solitary enjoyment of the available views, as well as variation in seating arrangements and other improvements, would enhance the use of the Presidio's visual resources. Removal of select trees, if warranted, to enhance viewsheds would constitute noticeable visual change, but would not alter the value of the Presidio as a scenic resource, or substantially alter the visual character of the Presidio forest.

The replacement of the haphazard network of social trails throughout the Presidio with carefully planned and designed pedestrian and multi-use trail corridors would improve resource conditions and enhance views within these corridors.

The increase in the linear miles of trails would expand the visible presence of improvements and somewhat detract from the natural setting. The impact would be moderately detectable, but would not be expected to have an adverse effect on visual resources. Some of the new trails would replace existing social trails. In other cases, pedestrian trails or service roads would be converted to a multi-use trail. In addition, the new trails would be designed and constructed to visually blend with the existing surroundings to the maximum extent feasible. Vista views of the Presidio from Twin Peaks, the Marin Headlands, and Alcatraz would not be affected by new trails, due to the extensive vegetative cover of the Presidio, the low profile of trails, and the placement of the wide multi-use trails along historic and existing road corridors. Trail surface materials could be tinted to blend in

with surrounding terrain, and trail borders planted to keep the trail surface out of view from some vantage points.

Construction of the new trails would result in local, short-term, minor adverse impacts to visual resources. Development of the new trail alignments would occur gradually in phases, so construction-related impacts would be local to specific areas of the Presidio as well as temporary, thus lessening the short-term effect on visual resources.

Alternative C: Shared Use (Local, Long-Term, Minor, Adverse Impact)

Similar to the Mixed Use Alternative, the Shared Use Alternative would provide for improved access to vistas of the scenic resources of the San Francisco Bay Area and of the Presidio itself. It would provide improved connections between Presidio points of interest, new overlooks, and the removal of social trails, which would improve resource conditions and scenic views within these corridors. However, under this alternative, access to scenic vistas from the interior of the Presidio would primarily be available via multi-use trails (as compared to a balance of pedestrian and multi-use trails under the Mixed Use Alternative). The beneficial effects of this alternative would be somewhat offset by the additional multi-use and pedestrian trails, as well as the conversion of smaller-scale social and pedestrian trails to larger-scale multi-use trails. These trails would expand the area and the visible presence of improvements at the Presidio and detract from the natural setting of the park. Although views of the new multi-use and pedestrian trails would be partially obscured by the park topography and vegetation patterns, the emphasis on wider multi-use trails would be clearly detectable. The wider corridors created by the multi-use trails could also affect views of the Presidio from Twin Peaks and the Marin Headlands. The multi-use trails would likely be somewhat visible from these regional vistas, although views of the trails should be partially obscured by the vegetative cover at the park.

Alternative D: Dispersed Use (Local, Long-Term, Minor, Beneficial Impact)

The Dispersed Use Alternative would have less adverse impact on visual resources compared to the other action alternatives, since this alternative would include the fewest new multi-use trails. As discussed above, these trails would be often visible from roadways, and have a wide cross-section compared to the pedestrian paths.

Impairment

The No Action Alternative would not lead to impairment of the Presidio's visual resources or values. Implementation of the action alternatives would not impair park resources or values related to visual resources. These alternatives would increase opportunities for enjoyment of the park by increasing the number of viewpoints to observe scenic resources.

Air Quality

Affected Environment

The Presidio's location allows for excellent air circulation due to the prevailing west and northwest winds. Because there are no pollution sources west of the Presidio, the air moving into the area is of a very high quality.

Federal, state and local agencies operate a network of monitoring stations throughout California to provide data on ambient concentrations of air pollutants. Recent monitoring data from monitoring stations in San Francisco indicate occasional events in excess of the state standard for PM10 (particulate matter less than 10 microns in diameter). All other criteria air quality standards have not been exceeded in San Francisco over the past five years. Motor vehicles are the major source of air pollution in San Francisco.

Environmental Consequences

Alternative A: No Action (No Impact)

Under the No Action Alternative, there would be no construction-related dust impacts, and Bay Area Air Quality Management District (BAAQMD) recommended control measures for emissions of dust (see below) would not be required.

Alternative B: Mixed Use (Local, Short-Term, Minor, Adverse Impact)

The implementation of the Mixed Use Alternative would not require the installation or operation of new stationary sources of air pollutants. The alternative would not locate sensitive noise receptors close to an existing significant source of air pollution. Consequently, the alternative would not result in a substantial increase in air pollutant emissions.

Construction of approximately 56.2 km (35.1 mi) of new and regraded trails would generate dust (including PM10) primarily from "fugitive" sources. Fugitive sources are those emissions, such as vehicle travel over unpaved surfaces, that are released through means other than through a stack or tailpipe, and lesser amounts of other criteria air pollutants primarily from operation of heavy equipment.[6]

With respect to emissions sources other than fugitive dust, the related emissions are generally included in the emissions inventory that is the basis for regional air quality plans. These would not be expected to impede attainment or maintenance of ozone and carbon monoxide standards in the Bay Area (BAAQMD 2000).

Fugitive dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. To reduce construction-generated particulate matter (PM10)

[6] Particulate emissions from construction activities can lead to adverse health effects as well as nuisance concerns such as reduced visibility and soiling of exposed surfaces.

emissions, construction contractors would implement as appropriate the BAAQMD's recommended control measures for emissions of dust during construction (see Fugitive Dust Control Measures under Air Quality BMP in Appendix C). Implementation of these measures would result in construction impacts on air quality that would be considered to be insignificant.

Alternative C: Shared Use (Local, Short-Term, Minor, Adverse Impact)

The Shared Use Alternative would generate the smallest amount of dust since the fewest linear miles of trails would be modified – 51.8 km (32.4 mi) compared to 56.2 km (35.1 mi) of trails under the Mixed Use Alternative). As appropriate, construction contractors would implement BAAQMD's recommended control measures for emissions of dust during construction to ensure that there would be a less than significant effect on air quality. Therefore, this alternative would generate the least amount of dust.

Alternative D: Dispersed Use (Local, Short-Term, Minor, Adverse Impact)

The Dispersed Use Alternative would involve slightly more new trail modifications (52.5 km or 32.8 mi) than the Shared Use Alternative. Since BAAQMD recommended control measures would be implemented, air pollutant emissions from construction activities would be considered a less than significant impact.

Impairment

None of the alternatives would impair national park resources or values related to air quality.

Noise

Affected Environment

The Presidio is located in an urbanized area. Noise levels within the Presidio can fluctuate greatly, largely depending on the proximity to major roadways (e.g., 19th Avenue, Doyle Drive). Away from roadways, the Presidio is generally quieter than the surrounding urban environment of San Francisco because natural noise sources dominate and there is less urban activity. Non-traffic noise is caused by human activity (primarily recreational), occasional aircraft overflights and use of mechanical equipment for building operations (e.g., ventilation systems), landscaping, maintenance activities, building and paving renovation, and tree removal.

Environmental Consequences

Alternative A: No Action (No Impact)

Under the No Action Alternative, there would be no construction-related noise impacts.

Alternative B: Mixed Use (Local, Short-Term, Minor, Adverse Impact)

The Mixed Use Alternative does not propose installation or operation of new stationary noise sources. The alternative would not locate sensitive noise receptors close to an existing significant noise source. However, construction activities associated with 56.2 km (35.1 mi) of trail modifications (including 36.8 km, or 23 mi, of new trails) could result in a temporary increase noise levels within the park vicinity. Construction noise levels are regulated by NPS and the Trust, which are committed to complying with standards contained within the City's Noise Ordinance during construction. Powered construction equipment other than impact tools would also be required by the Trust and NPS to comply with the San Francisco Noise Ordinance (Article 20 of the City Police Code, Section 2907b), which limits construction noise to 80 decibels at 100 ft. NPS and the Trust, in accordance with the Noise Ordinance (Section 2908) also prohibit construction work at night from 8:00 p.m. until 7:00 a.m. Because the federal agencies would require contractors to comply with all applicable regulations of the San Francisco Noise Ordinance during the construction of trails and bikeways, the alternative would have a minor effect on noise levels.

Alternative C: Shared Use (Local, Short-Term, Minor, Adverse Impact)

Temporary construction-related noise impacts of the Shared Use Alternative would be less than the Mixed Use Alternative, since there would be fewer trails that would be upgraded, 51.8 km (32.4 mi) compared to 56.2 km (35.1 mi). All applicable regulations of the San Francisco Noise Ordinance would be complied with during construction activities. Therefore, a minor effect on noise levels would result.

Alternative D: Dispersed Use (Local, Short-Term, Minor, Adverse Impact)

The Dispersed Use Alternative would increase noise levels less than the Mixed Use Alternative, with 52.5 km (32.8 mi) of new trail modifications proposed. Contractors would comply with all applicable regulations of the San Francisco Noise Ordinance during construction, and therefore construction-related noise impacts would be considered less than significant.

Impairment

None of the alternatives would impair NPS resources or values related to noise.

Cumulative ImpactS

A cumulative impact[7] is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. In general, cumulative effects have been described within the 1994 GMPA Final EIS (for Area A) and the 2002 PTMP Final EIS (for Areas A and B). The analysis below summarizes relevant cumulative actions (see Appendix D) and summarizes their impact in conjunction with the

[7] Note: The following discussion applies to all alternatives with the exception of the No Action Alternative

impacts of the alternatives. Because most of the cumulative projects are in the early planning stages, the evaluation of cumulative impacts was based on a general description of the project. Overall, the incremental adverse effects associated with the Trails Plan are expected to be either short-term or negligible and are not expected to result in cumulative effects that are significant. In many instances, the incremental contribution of the Trails Plan to the cumulative effect on the Presidio would be beneficial.

Geology. Neither the proposed action nor the cumulative projects would increase the likelihood or intensity of seismic activity at the Presidio, or the risk of other geologic hazards such as settlement or landsliding. Most seismic and geologic hazards are unpredictable and unavoidable, and would continue to affect visitors and residents at the Presidio regardless of the proposed cumulative actions. Short-term construction impacts, especially those related to soil erosion and topsoil loss, could occur with additional cumulative projects. These cumulative soil erosion impacts would be offset by required compliance with BMPs and project Standard Conditions.

Hydrologic Resources. Construction of a Doyle Drive tunnel could result in a change to the hydrologic regime and loss and/or alteration of the localized wetland features and processes, vegetation richness and associated wetland habitat values. The tunnel could also affect establishment of a healthy functioning wetland system between the freshwater inflow of Tennessee Hollow and Crissy Marsh. Removal of the majority of social trails, followed by habitat restoration as called for in the VMP and the proposed project, would protect wetlands from negative human intrusions and likely have a beneficial impact on hydrologic features. Cleanup of the Presidio's numerous environmental remediation sites under the Presidio Environmental Remediation Program would occur within or directly adjacent to hydrologic resources, and could result in either the short-term or long-term redirection of surface and groundwater flow within these areas. However, it is anticipated that the program's long-term beneficial impacts to hydrologic resources and water quality would exceed the short-term impacts by their coordination of subsequent habitat restoration efforts with implementation of the PTMP, the GMPA and the VMP. Appropriate management practices or mitigation measures for subsequent programs would be identified to provide both short-term and long-term protection and enhancement of hydrologic resources. Finally, the proposed Mountain Lake Enhancement Plan would benefit hydrologic resources and water quality values through restoration and management activities. This beneficial effect would contribute cumulatively to the presence of valuable water resources within the Presidio.

Biological Resources. Cumulative projects that would have both adverse and beneficial effects on biological resources include the Trails Plan, the Presidio Environmental Remediation Program, the VMP and the PTMP. Construction and recreation activities associated with these projects may result in trampling or removal of individual plants, soil compaction, erosion, and effects that may influence the presence of invasive species. Moderate levels of ground disturbing activities may reduce competition from more abundant or invasive species. Erosion may result in burial of seed or individual plants, thus reducing the genetic variability of the population. Beneficial effects include expanded habitat area, increased public education, restricted pedestrian access to sensitive vegetation,

and fencing. These adverse and beneficial effects are discussed for the individual projects contributing to cumulative impacts below.

In addition to habitat restoration, the Trails Plan would benefit native plant communities, including federally listed plants, protected wetlands and wildlife, by managing human access and redirecting access away from sensitive habitat areas. The establishment of and the extent of effects within social trails would be reduced within areas supporting federally listed species or within recovery areas. Existing trails would be surfaced and/or widened, and new trails would be constructed in the dunes near Baker Beach housing, Inspiration Point, Lobos Creek Valley, western coastal bluffs and the Tennessee Hollow Creek corridor. All trail planning would be coordinated with future restoration implementation efforts, and final alignments would be selected based upon avoidance of optimum habitat for the establishment of listed species. Minimization and compensatory measures included in the Final Biological Opinion and BMPs included in the Trails Plan would be incorporated into the project to minimize effects to biological resources.

Generally speaking, projects proposed under the Presidio Environmental Remediation Program would provide beneficial effects to biological resources. The cleanup sites are not currently composed of native soils capable of supporting native plant communities and listed species, but appropriate soil conditions to support native plant communities would be restored, as feasible, following cleanup actions. Although the construction activities may result in short-term loss to adjacent habitat affected by construction, there is no permanent loss anticipated. Through implementation of the remediation projects, approximately 6 h (15 ac) of federally listed plant habitat would be restored at sites that currently do not provide suitable habitat for these species.

The PTMP would benefit native plant communities, including wildlife habitat and habitat for listed species, primarily through the removal of existing buildings and infrastructure built on habitat in the southern portion of the park. Replacement construction would not occur within habitat for listed species. Native plant habitat would be expanded from the existing 28 h (70 ac), to about 84.8 h (212 ac). Construction activities associated with PTMP implementation have the potential to have a short-term effect on a maximum of three acres of existing lessingia habitat; however, no permanent loss of existing habitat would occur.

Projects implementing the VMP would protect, enhance, restore and rehabilitate the native and planted vegetation of the Presidio. Guidance provided by the VMP would reduce the potential for adverse effects to biological resources and establish a framework for a coordinated management effort in rehabilitating and restoring native plant communities, historic forests, and landscaped areas of the Presidio. The VMP designates the southwest corner of the Presidio as a Special Management Zone to further focus on the specific conditions in this area, including recovery tasks for restoration and management for the lessingia. Specific plans for forested areas within this zone would be prepared in consultation with the USFWS to ensure the conservation of lessingia in the long-term.

Other cumulative projects in the Presidio, specifically the Letterman Digital Arts Center and the Presidio Water Recycling Project, would have negligible impacts on biological resources. The Doyle

Drive project would occur in areas that are already developed and have relatively few biological resources. These projects are therefore not expected to contribute measurably to cumulative effects on biological resources. The Tennessee Hollow Restoration and Crissy Marsh Expansion would result in a net benefit to plants and wildlife.

Cultural Resources. The analyses of potential cultural resource impacts associated with cumulative projects address the potential for NPS and Trust actions to result in an adverse effect on individual historic resources, the Presidio cultural landscape, and on the overall significance of the NHLD, which encompasses both Areas A and B. Potential cumulative impacts associated with the rehabilitation of currently vacant historic buildings, replacement of non-historic buildings with compatible new construction, rehabilitation of cultural and natural landscapes, water conservation, improvements to traffic safety and efficiency, and enhancements to the visitor facilities and programs, would be beneficial. For historic buildings to be rehabilitated, either a compatible new use or the use for which the building was originally designed would be selected so as not to materially alter the building's defining characteristics. Some historic buildings may have to be altered to accommodate new uses. In these instances, the standards for rehabilitation contained in The Secretary of the Interior's Standards for the Treatment of Historic Properties (NPS 1992) would set the minimum standards for proposed changes. Under Section 110 of the NHPA, all federal agencies must carry out their programs in accordance with national historic preservation policy, and make efforts to minimize harm to National Historic Landmarks. Furthermore, Section 110(f) of the NHPA charges federal agencies to afford some special protection to National Historic Landmarks. Specifically, it requires that the agency "to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm" to a National Historic Landmark that may be directly and adversely affected by an undertaking. Section 106 of the NHPA requires federal agencies to take into account the effects of their actions on historic properties and seek comments from an independent reviewing agency, the Advisory Council on Historic Preservation. Adherence to the Section 106 process through the NPS and Trust Programmatic Agreements, which provide the frameworks for the necessary consultation process for proposed undertakings, would avoid unnecessary harm to historic properties.

Impacts associated with new construction activities would be considered less than significant, due to:

- Limits set on the level of new construction
- Commitments to additional planning, environmental analysis, and public input for a proposed undertaking
- NPS and the Trust's policies to preserve the integrity of the NHLD, and to follow planning, design and building-specific guidelines
- The requirement for further consultation under Section 106 and the PAs

The Doyle Drive project could have the potential to remove multiple historic buildings affecting the integrity of the NHLD. For example, if most of the World War I warehouses are demolished, the

ability to interpret the history of the NHLD would be affected. Removal of Battery Slaughter and Battery Blaney would also affect the integrity of the NHLD.

The cumulative context for archaeological resources includes projects within the Presidio that could disturb or destroy archaeological resources during excavation or grading. Such projects include the Doyle Drive Project, the Mountain Lake Enhancement Plan, the Trails Plan, and the Letterman Digital Arts Center project. The Tennessee Hollow project and any proposed expansion of Crissy Marsh cannot be evaluated until specific restoration/expansion alternatives are identified. Cumulative impacts on known prehistoric archaeological sites or historic archaeological resources are, in general, not expected to be adverse. Possible exceptions include prehistoric and historic sites along Crissy Field, which could be subjected to impacts from the Doyle Drive Project and any expansion of Crissy Marsh. In particular, for the Doyle Drive Project, any below-ground or tunnel features pose the greatest threat to buried prehistoric and historic archaeological sites. The Federal Highway Administration and Caltrans would be conducting further investigations to identify specific archaeological site boundaries and impacts to archaeological sites. The Crissy Marsh Study itself would have no cumulative effect on archaeological resources because it would not develop alternatives, but would provide a technical basis to inform a later environmental review process. As such, it would be speculative to predict specific impacts on archaeological resources from marsh expansion or Tennessee Hollow restoration until specific alternatives are identified. The Mountain Lake Enhancement Plan is an ongoing project for which an archaeological management assessment would be prepared prior to implementation. The lake and its original shoreline have the potential for prehistoric archaeological sites and for remains of the 1776 Anza Spanish encampment. An archaeological field survey and testing program would be conducted and the project would be redesigned if necessary to avoid impacts to significant archaeological sites. No cumulative impacts on archaeological resources are expected from the Trails Plan because the plan calls for the redesign of routes and facilities to avoid all such effects. The 9.2 h (23 ac) Letterman Digital Arts Center project is also not expected to contribute to cumulative archaeological impacts, because no evidence of buried archaeological sites was found during a recent investigation. Archaeological monitoring would take place during the demolition and new construction phases, and the process defined in the Programmatic Agreement for the Letterman project would be adhered to.

Because implementation actions under the PTMP and the above projects would involve site investigations prior to excavation and monitoring for archaeological resources as needed during excavation, the likelihood that archaeological resources would be destroyed or damaged without appropriate attention to recordation and recovery would be minimized. Therefore, cumulative impacts are not expected to be significant.

Traffic Safety. A number of cumulative projects would have a beneficial effect on traffic safety in the Presidio's trail corridors. These projects include the Crissy Field Project, the Presidio Internal Shuttle, and the Golden Gate Bridge Toll Plaza Redesign. These projects, individually and in combination, would reduce congestion by encouraging travel to the park by alternative forms of transportation (e.g., nonprivate vehicles). For example, the promenade at Crissy Field is an important connection

between San Francisco and the Golden Gate Bridge, while a second set of pathways adjacent to Mason Street provides alternate routes through the area for bicycles and pedestrians, separated from automobile traffic. The Presidio Internal Shuttle provides reliable, frequent alternative transportation for residents, tenants, and visitors to the Presidio, and facilitates access within the park, and to and from the park, by connections with public transit.

Implementation of the PTMP would result in a substantial increase (about 200 percent) in pedestrian and bicycle activity within the Presidio (between 14 to 18 percent of all trips generated by the PTMP land uses are anticipated to occur by walking and bicycling as the primary mode). The cumulative pedestrian and bicycle activity would be generally accommodated within the existing pedestrian and bicycle network, plus proposed improvements outlined in the Trails Plan.

Reasonably foreseeable projects that could have a short-term, adverse effect on traffic safety include the Golden Gate Bridge District Seismic Retrofit, Phase II; the Doyle Drive Environmental and Design Study; and the Letterman Digital Arts Center project. The adverse effects associated with these projects would be short term in nature, primarily related to construction-generated traffic on existing roads and trails and possible use of trail staging areas. Construction activities would be geographically dispersed, and would occur intermittently. Cumulative effects would be minimized through preparation and implementation of construction traffic management plans, which would provide specific truck routes and other measures, to ensure that individual projects are coordinated. These projects would not result in any net, long-term effects on traffic safety within the Presidio. The short-term, construction-related traffic impacts that could result from development of site-specific cumulative projects would not appreciably alter these long-term, beneficial impacts.

Visitor Use. Cumulative projects would have a beneficial cumulative effect on visitor experience due to an increased array of visitor facilities including increased regional trail connectivity, an enhanced Presidio-wide interpretive program, new public gathering spaces, increases in open space, and improvements to the Golden Gate Promenade. The Crissy Field Plan has already had a beneficial effect on the educational and interpretative (as well as recreational) opportunities for visitors. Such planning efforts as the Trails Plan, Bay Area Ridge Trail, San Francisco Bay Trail, San Francisco Bicycle Plan, and Metropolitan Transportation Commission Regional Bicycle Plan would collectively promote regional trail connectivity by linking the Presidio to recreation corridors in San Francisco and the Bay Area through a robust network of pedestrian and bicycle-friendly facilities. The NPS and Trust are embarking on a park-wide interpretive program that would enhance visitor experience and identify locations, such as trails, where interpretive programs could be presented. In addition, expanded facilities and programming under the PTMP would complement the visitor experience offered by the NPS' Presidio operations, the rest of the GGNRA and other regional visitor resources. As discussed in the PTMP EIS, the Trust would implement measures to ensure that future visitation does not adversely impact the Presidio's resources or the public's enjoyment of the park.

Visual Resources. Removal and revegetation of the majority of undesignated trails, as called for in the Presidio Trails and Bikeways Master Plan, would have a beneficial effect on the visual quality in the park as the areas are returned to a natural state. Other cumulative projects that would have a net

local, long-term, beneficial cumulative effect on scenic resources include those that would improve the general health of ecosystems visible from or within the Presidio, including the Crissy Field Project, the VMP, the Mountain Lake Enhancement Plan and the Tennessee Hollow Riparian Corridor Enhancement Project. Implementation of the Crissy Field Project has transformed 100 acres of asphalt surrounded by chain link fence to a restored dune and tidal marsh system, with greatly enhanced naturalistic scenic resource values. The VMP would rehabilitate and restore native plant, historic forest, and landscaped areas of the Presidio. In particular, the VMP would restore historic viewsheds that include overlooks and other vantage points located throughout the Presidio by removing nonnative vegetation, and planting low-lying native plants so that native communities can become reestablished and clear views within historic viewsheds can be more easily maintained. Actions in the Mountain Lake Enhancement Plan would also enhance native vegetation, but would not substantially alter the visual environment in the Presidio.

Changes within the 9.2 h (23 ac) Letterman Digital Arts Center site include replacement of the existing 10-story former hospital, which has improved views within the Presidio. Construction of improvements to Doyle Drive would generally improve views by placing portions of the roadway at or below ground level. Finally, the PTMP would protect and enhance natural and cultural resources, and increase the quality and quantity of open space at the Presidio, which would have a local, long-term, beneficial impact on visual resources. The PTMP would reduce the existing overall building square footage with some compatible new construction balanced with building removal. New built features would be required to conform with planning district guidelines intended to protect visual resources. Short-term construction related activities and new built features associated with implementation of the PTMP could temporarily affect visual resources. However, these impacts would be incremental and localized.

Air Quality. Construction activities related to the cumulative projects could contribute cumulatively to dust and other emissions, which would have minor, temporary effects on air quality within the Air Basin. The Bay Area Air Quality Management District requires implementation of various control actions to minimize these effects, and the cumulative projects' contribution to basin-wide construction emissions would be very small.

Noise. Noise is a localized issue limited to the geographic area adjacent to or in the vicinity of a project or activity. Noise can be short term, during construction, or ongoing, as with noise from a highway. Short-term cumulative impacts could be related to concurrent Presidio construction projects and the reconstruction of Doyle Drive. All new development would be subject to the limitations of the San Francisco Noise Ordinance. Over the long term, cumulative actions within the Presidio would coincide with anticipated region-wide growth in traffic noise, especially from traffic on U.S. Highway 101 and U.S. Highway 1. Noise from other sources and activities within the Presidio would add to this effect. These cumulative effects were analyzed in both the GMPA and PTMP EISs, and were found to be minor. Should Doyle Drive involve construction of a tunnel, this would have a cumulative beneficial long-term noise impact on the Presidio.

Impact Topics Dismissed from Further Analysis

Floodplains

Executive Order 11988 requires that all federal agencies conduct an analysis of their proposed action on floodplains. Pursuant to this Order, floodplains are defined by the Federal Emergency Management Agency as the 100-year floodplain. The Presidio of San Francisco is located entirely outside of the designated 100-year floodplain, and therefore this topic is not addressed further.

Environmental Justice

Executive Order 12898 requires that all federal agencies evaluate the impact of proposed actions on minority and low-income populations. This Order is specifically designed to prevent disproportionate environmental impact of federal actions on these groups. Implementing the Trails Plan would not have an adverse impact on surrounding populations, and these populations are not considered minority or low-income.